



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/831,001	09/19/2001	Cindy Theresa Cornelia Cuypers	702-010717	8959

7590

11/17/2003

Richard L Byrne
700 Koppers Building
436 Seventh Avenue
Pittsburgh, PA 15219-1818

EXAMINER

MENON, KRISHNAN S

ART UNIT

PAPER NUMBER

1723

DATE MAILED: 11/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/831,001	CUYPERS ET AL.	
	Examiner	Art Unit	
	Krishnan S Menon	1723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claims 13-32 are pending in the application.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 13, and 15-18 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by WO 97/49477.

WO 97/49477 discloses a device for treating a gas/liquid mixture comprising a tube (1 – fig 1) with inlet (A-fig1) and outlet (8-fig 1), rotating means (5-fig 1), outlet openings down-stream of the rotating means for lateral flow of the liquid drops (9-fig 1), an axial return conduit centrally located through the rotating means (12-fig 1), and divergence means in the return conduit (7-fig 1) as in instant claim 13. The flow path of the mixture comprises the flow path as outlined in claim 13 (see figure 1). The newly added limitation of the flow to diverge “substantially” laterally: Word substantial means “considerable in quantity” (Webster’s Collegiate Dictionary, 10th Ed.), and considerable quantity of flow could diverge from the axial direction from the nozzle 7 of WO’477. See page 4 lines 5-8, where it describes the secondary flow being drawn by the main flow due to the cyclonic action of the main flow, and the main flow is described as “... at least to a considerable extent radially ... together with ... 20% of the gas flow...” in page 3 lines 29-36.

The divergence means is a “substantially” conical element extending into the return conduit as in instant claim 15 (7-fig 1). Truncated cone 7 can be considered

extending into the return conduit, if the end of the return conduit is considered as being at the outer rim of the truncated cone (Again, "substantial" by Webster means only 'largely, but not wholly' and a truncated cone could be substantially conical).

The outlet openings are a number of longitudinal slots as in instant claim 16 (9-fig 1)

The rotating means is a swirl element with varying outflow angle as in instant claim 17 and 18 (see figure 1).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 97/49477.

WO 97/49477 teaches all the limitations of claim 13 as above. Claim 19 adds further limitation of the size of the separated droplets, which WO 97/49477 does not teach. However, it would be obvious to one of ordinary skill in the art at the time of invention to realize that the separation apparatus having similar structure as in the present application would generate similar sized droplets in a gas-liquid separation.

2. Claim 14, 20, 21, and 25-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 97/49477 in view of Hodgson (US 4,187,089).

WO 97/49477 teaches all the limitations of claim 13 as above. Claims 20 and 21 add further limitations as follows: WO 97/49477 discloses an installation (page 2 line 17- page 3 line 2; fig 1) having a vessel with a supply connections stub (A-fig 1), one or more boxes in which one or more devices for treating gas/liquid mixture is arranged (page 2 line 34 – page 3 line 2) as in instant claims 20 and 21. WO 97/49477 does not describe a liquid drain conduit from the bottom of the vessel as in claim 20. Hodgson teaches a liquid drain from the bottom of the vessel (50,52-fig 1). It would be obvious to one of ordinary skill in the art at the time of invention to provide a drain for the liquid as taught by Hodgson in the teaching of WO'477 for disposing the collected liquid.

WO 97/49477 does not disclose the divergence means as comprising a number of slots in the return conduit as in claim 14 and 27, closed end as in claims 25 and 26, or an obstruction in the return path as in claim 27, . Hodgson (089) teaches a number of vertical slots formed between baffle plates (46-fig 1) and the conical end cap (obstruction) (44-fig 1) at the end of the tube (24-fig 1) for diverging the fluid mixture radially outwardly from the tube (24-fig 1). It would be obvious to one of ordinary skill in the art at the time of invention to use the teachings of Hodgson (089) to have the slots and the conical end-cap at the end of the return conduit instead of the cone-shaped end of the return conduit of WO 97/49477 because Hodgson (089) teaching would coalesce the droplets carried in the mixture stream of the return conduit more efficiently and improve the lateral divergent flow of the stream (col 3 lines 28-30).

Re claims 29-32, the additional limitations are similar to that of claims 15-18, and are described in the rejections of claims 15-18 above.

3. Claims 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 97/49477 in view of WO 93/05339.

WO 97/49477 discloses a device according to claim 13 as described above, with inlet opening for the mixture (A-fig 1), and rotating means for setting the mixture to a rotating motion (5-fig 1) as in instant claim 22.

WO 97/49477 does not disclose a conical outlet with 1-30 deg cone angle as in instant claim 22 and 23 or an additional tube part as in instant claim 24. WO 93/05339 teaches such a conical outlet (3, fig 1) and an additional tube part (9-fig 1) in the outlet of a similar liquid-gas mixture separation device. It would be obvious to one of ordinary skill in the art at the time of invention to use the teachings of WO 93/05339 in the teachings of WO 97/49477 to make the outlet end conical with the additional tube part because it would decrease the carry over of the liquid droplets in the gas stream as taught by WO 93/05339 (lines 20-37, page 10)

Response to Arguments

In response to applicant's argument that the creep interrupter 7 will not cause a divergent flow, and the flow remains in the circular shape of the channel 6 as it exits channel 6, please note the passages in WO'477 pages 3 and 4, quoted in the rejection. In a normal fluid flow exiting a nozzle, the flow will be streamlined if the surrounding

atmosphere has no turbulence. In the instant case, the surrounding atmosphere is extremely turbulent, with the main flow having a swirling motion having a significant radial component, the recycle flow will get sucked into the low pressure created by the swirling main flow, which will generate ample lateral divergence to the recycle flow even without the diverging cone. The diverging cone will only help the divergence further. The claims recite a 'means plus function' for the divergence flow, and WO has provided such means, with clear explanation.

Argument regarding claim 19, droplet size: WO 97/49477 teaches an apparatus having similar structure for separation of similar liquid gas mixture, and therefore, similar sized droplets could be expected in the separated part of the mixture [Inherency: Under the principles of inherency, if a prior art device, in its normal and usual operation, would necessarily perform the method claimed, then the method claimed will be considered to be anticipated by the prior art device. When the prior art device is the same as a device described in the specification for carrying out the claimed method, it can be assumed the device will inherently perform the claimed process. *In re King*, 801 F.2d 1324, 231 USPQ 136 (Fed. Cir. 1986)].

Arguments re Hodgson ref: Hodgson ref teaches a conical end cap 44 (fig 1 and 2) with spaced baffles (ribs) 46 at the end of the pipe gas flow pipe 38, which provides a structure for laterally diverging the gas-liquid mixture coming through the pipe 38, which is equivalent to the applicant's invention. In response to applicant's argument that the baffle 44 is similar to the creep interrupter 7 of WO'477, the creep interrupter is a truncated cone with a through hole in the bottom whereas baffle 44 is a complete cone

which closes the end of the pipe as in the applicant's invention. Re the pipe 38 being horizontal or vertical should not make any difference to this flow. Having slots at the end of the pipe instead of having the ribs as provided by Hodgson is only an obvious variation of the structure. Re the argument that baffle 44 is for reversing the flow and Hodgson does not suggest a return conduit, Hodgson is not used for overcoming a deficiency of a return conduit in WO'477, but to show an improved method of diverging the flow for better removal of liquid droplets from the flow, as taught by Hodgson, which one of ordinary skill in the art could use to modify WO'477.

Re '339 ref: applicant agrees that the '339 ref teaches a conical perforated tube section 3, with an outlet tube 9 mounted concentric to conical-section 3. Now, this outlet tube extends in the upstream direction into tube 1 up to the point marked 10 in fig 1. Claims 22-24 recites this structure. Ref '339 is used only for this structure and is not intended to overcome any other deficiencies of ref '477.

Arguments re Hodgson ref with respect to claims 27-32: in response to applicant's argument that Hodgson teaches away, the quoted passage from Hodgson only says that the water droplets impinging the baffle 44 will not go forward with the gas stream, but coalesce and fall, which is true in the applicant's case too, and therefore, how can it be teaching away? Further, the reason for combining the reference does not have to be exactly what the applicant intended in the applicant's invention; and one of ordinary skill in the art would use the Hodgson baffle in WO'477 to have the water droplets coalesce to larger drops and for quicker separation in the swirling flow as they reenter the main stream. In response to applicant's argument that there is no

suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Hodgson teaches a way of increasing the liquid separation from the gas stream by providing a baffle, which would be the motivation to combine.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Application/Control Number: 09/831,001
Art Unit: 1723


Page 9

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S Menon whose telephone number is 703-305-5999. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L Walker can be reached on 703-308-0457. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Krishnan Menon
Patent Examiner


JOSEPH D. DODGE
PRIMARY EXAMINER